CARL.
Controller

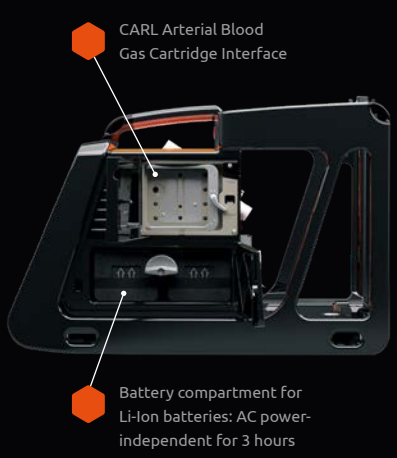
High-performance perfusion system for controlled extracorporeal cardiac and/or pulmonary support, especially for the treatment of patients requiring resuscitation.

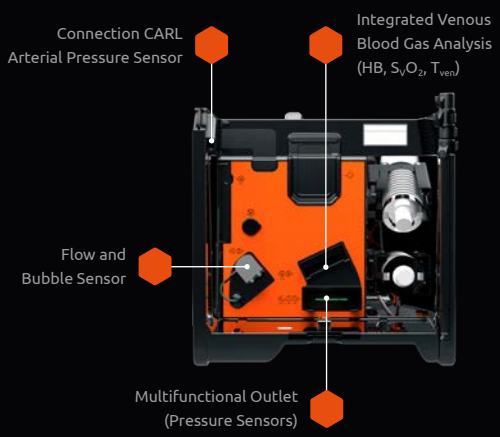
CARL.
A HEARTBEAT AHEAD

CARL. Controller

KEY FEATURES:

- High-performance, automated dual pump control for high pulsatile blood flows
- Comprehensive measurement sensors with venous and arterial blood gas analysis as well as intra-aortic blood pressure monitoring through optionally integrable fiber-optic catheter
- Automated priming mode for de-airing of the CARL Reperfusion Set in a few minutes
- Intuitive and user-friendly operating interface with 8.4" touchscreen
- Emergency display





SELECTED TECHNICAL SPECIFICATIONS:

Measurements (Length x Width x Height)	575 x 375 x 405 mm
Weight	16 kg
Blood Flow	1-8 l/min
Graphic User Interface	8.4", colour 800 x 600 pixels
Power Supply	100-240 Vac, 50 to 60 Hz
Battery Operation	Up to 4.5 hours
Interfaces	1x USB (data export via USB drive)
Sensors	• 1 Flow and bubble sensor • 3 Pressure sensors via CARL Reperfusion Set • Venous blood gas analysis (HB, S_vO_2, T_{ven}) • Arterial blood gas analysis via CARL Arterial Blood Gas Cartridge: pO_2, pH, K, Na, Ca • 1 Intra-aortic pressure sensor via CARL Arterial Pressure Sensor

INTERFACES:

- CARL Reperfusion Set
- CARL Arterial Pressure Sensor
- CARL Arterial Blood Gas Cartridge
- CARL Cart
- CARL Rack

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CARL. Cart & CARL. Rack

CARL Cart

Equipment trolley for intra-hospital transport and stationary use of the CARL System.

CARL Rack

Transport bridge for the safe transport of the CARL Controller in emergency vehicles or ambulances.

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CARL. Cart

KEY FEATURES:

- Easy intra-hospital transport of all hardware components of the CARL System
- Narrow design for efficient use in space-restricted scenarios (e.g. in hospital elevators)
- Oxygen cylinder holder (cylinder size 2-3 L)
- Medical 4-way socket strip
- Infusion Pole

SELECTED TECHNICAL SPECIFICATIONS:

Measurements (Length x Width x Height)	74 x 61 x 95 cm
Weight	45 kg

INTERFACES:

- CARL Controller
- CARL Cooler (with CARL Cooler fastening strap)
- CARL MOX via CARL MOX Wall Bracket
- Stationary hypothermia units from other manufacturers

CARL. Rack

KEY FEATURES:

- Ground-based transport of the CARL Controller on a patient stretcher
- Compatible with the following stretchers: Stryker M1, PowerPro XT, PowerPro TL

SELECTED TECHNICAL SPECIFICATIONS:

Measurements (Length x Width x Height)	58 x 44 x 46.5 cm
Weight	12.9 kg

INTERFACES:

- CARL Controller
- Stryker M1 Stretcher, PowerPro XT, PowerPro TL

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CARL.
Reperfusion Set

Compact Plug and Play tubing set for extracorporeal cardiac and/or pulmonary support with the CARL Controller, especially in resuscitation scenarios.

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CARL. Reperfusion Set

KEY FEATURES:

- Plug and Play for quick and easy start of therapy with the CARL Controller
- Automated de-airing via the CARL Controller with a patented priming bag in a few minutes
- Three integrated pressure sensors, no separate de-airing necessary, common connection using a multi-functional outlet plug
- Cuvette for measuring venous blood gases (temperature, hemoglobin, oxygen saturation)
- Integrated interface for intra-aortic pressure monitoring via CARL Arterial Pressure Sensor

SELECTED TECHNICAL SPECIFICATIONS:

Priming Volume	890 ml
Pump Head Speed Range	0-10,000 U/min
Connection - blood	3/8“
Connection - water	3/8“ Hansen coupling
Pressure Sensors‘ Measuring Range	-400 mmHg - 400 mmHg
Pressure Sensors‘ Measuring Accuracy	±1% 0-50 mmHg, ±3% 51-400 mmH
Max. Usage Time	24 Hours

INTERFACES:

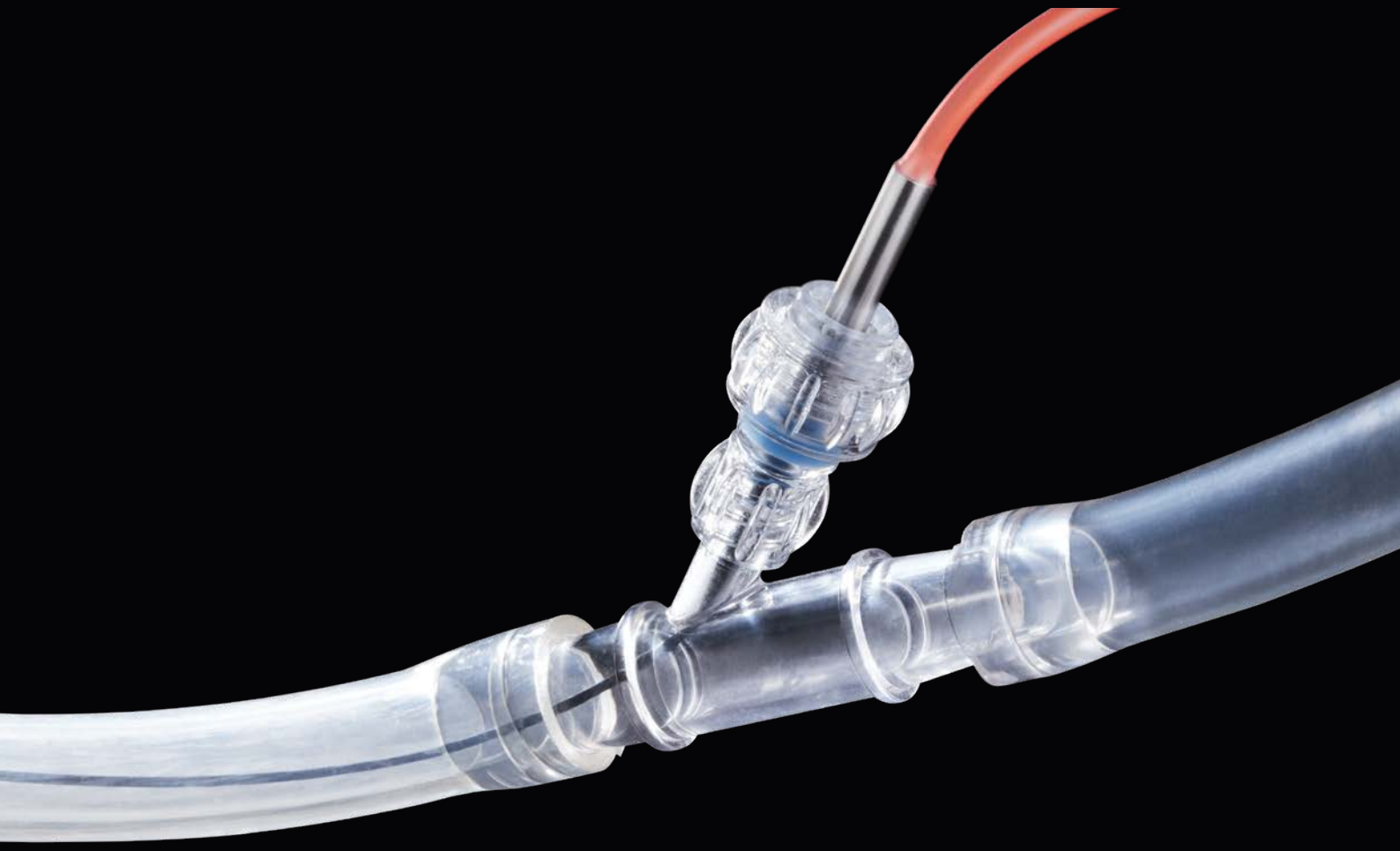
- CARL Controller
- CARL Arterial Blood Gas Cartridge
- CARL Arterial Pressure Sensor
- CARL MOX
- CARL Cooler

CARL.
A HEARTBEAT AHEAD

PS_Reperfusion_Set_EN_2022_09_30_Rev02

CARL. Arterial Pressure Sensor

Fiber-optic catheter for intra-aortic pressure measurement via the CARL Reperfusion Set with monitoring interface to the CARL Controller.



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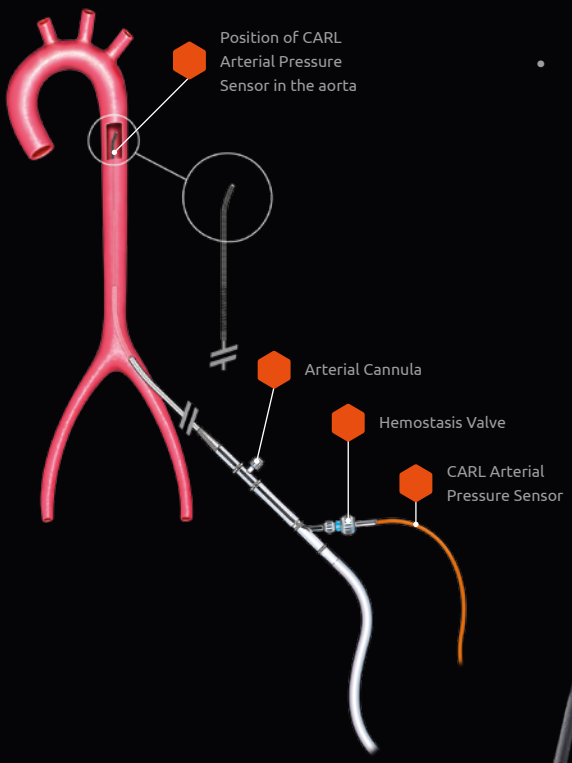
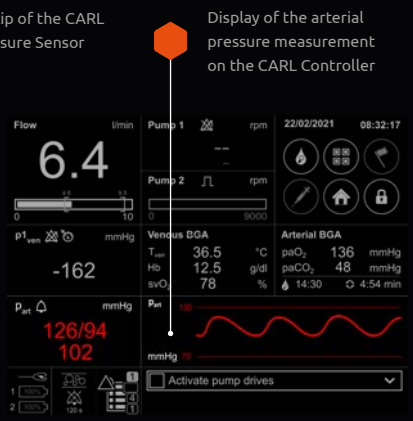
CARL. Arterial Pressure Sensor

KEY FEATURES:

- Minimally invasive measurement of arterial blood pressure in the descending aorta
- Fiber-optic catheter integrated into Seldinger wire with 45° angled atraumatic tip for easy intravascular insertion
- Easy and fast implantation via the CARL Reperfusion Set using integrated 3/8-3/8'' connector with a 45° Luer lock female and hemostasis valve, no separate puncture necessary
- Visualization of arterial blood pressure with the CARL Controller





SELECTED TECHNICAL SPECIFICATIONS:

Total Length	3511 mm
Insertion Length	769 mm
Diameter	1.2 mm
Measuring Range	0 mmHg to 300 mmHg
Measuring Accuracy	±7 mmHg (0 mmHg to 70 mmHg) ±10% (71 mmHg to 300 mmHg)
Max. Usage Time	6 Hours

INTERFACES:

- CARL Controller
- CARL Reperfusion Set

PS_CAPS_EN_2022_09_30_Rev02

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CARL. Arterial Blood Gas Cartridge

Disposable cartridge for continuous measurement of arterial blood gas parameters with monitoring interface to the CARL Controller.

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CARL. Arterial Blood Gas Cartridge

KEY FEATURES:

- Implementation of up to 25 measurements in variably selectable time intervals (1.5 min, 3 min, 5 min)
- Monitoring and display of the measured values via the CARL Controller
- Safe use due to one-way valve in the sample supply line. No transfer of air, calibration fluid or sample blood into the patient.

SELECTED TECHNICAL SPECIFICATIONS:

Sample Volume	1-4 ml
Max. Usage Time	3 Hours
Measurement parameters	Partial oxygen pressure (p_aO_2): 40-79mmHg ±15 mmHg 80-150 mmHg ±20 mmHg pH-value: 6.75-7.80 ±2% Potassium concentration (K^+): 1.5-10.0 mmol/L ±10% Sodium concentration (Na^+): 130-145 mmol/L ±5% Calcium concentration (Ca^{2+}): 0.5-1.4 mmol/L +0,1 mmol/L to -0,2 mmol/L

INTERFACES:

- CARL Reperfusion Set
- CARL Controller

CARL.
A HEARTBEAT AHEAD

PS_CABGA_EN_2022_09_30_Rev01

CARL. Cooler & CARL. Cooler Kit

CARL Cooler
Mobile hypothermia unit for effective patient cooling in or outside of hospital.

CARL Cooler Kit
Compact disposable initiating the endothermic cooling reaction.

CARL.
A HEARTBEAT AHEAD

CARL. Cooler & CARL. Cooler Kit

KEY FEATURES:

- Designed for use within and outside of hospital
- Up to 4 °C cooling capacity within a few minutes
- AC power-independent operation by means of a separate battery
- Cooling through endothermic dissolution of urea in water
- Contamination of the unit is not possible, water-bearing components are designed to be replaced after single use
- Alternating availability of the batteries in the CARL Cooler and CARL Controller for additional patient safety

SELECTED TECHNICAL SPECIFICATIONS:

Cooling Circuit Flow Rate	0.8 l/min
Capacity	5 L
Cooling Capacity	Max. 3.8 kWh (ΔT 4 °C < 30 min at approx. 80 kg body weight)
Measurements	630 x 375 x 405 mm
Weight	CARL Cooler Hardware: 17.8 kg CARL Cooler Kit: 6.5 kg
Connection - water	3/8“

INTERFACES:

- CARL Reperfusion Set
- CARL Cart

CARL.
A HEARTBEAT AHEAD

CARL. MOX & CARL. MOX Wall Bracket

CARL MOX:
Mobile gas blender for controlled oxygenation and decarboxylation of patient blood in the extracorporeal circuit.

CARL MOX Wall Bracket:
Holder for mounting the CARL MOX for use within or outside of hospital.

CARL.
A HEARTBEAT AHEAD

CARL. MOX & CARL. MOX Wall Bracket

KEY FEATURES:

- Precise control of oxygenation and decarboxylation (pO_2 and pCO_2)
- Automated mixing of ambient air with oxygen from external oxygen source, no medical compressed air required
- Up to 4 hours of battery power for out-of-hospital use
- Variable mounting system for use in the ambulance or on the CARL Cart; compatible with standard rails measuring 25 x 10 mm according to DIN EN ISO 19054

SELECTED TECHNICAL SPECIFICATIONS:

Measurements (Length x Width x Height)	465 x 376 x 179 mm
Weight	6.8 kg
Display	7“, colored | 800 x 480 pixel
Power Supply	100 to 240 Vac | 50 to 60 Hz
Batteries	2 of 14.4 Vdc Duration: 4 hours
Gas Flow	0-12 l/min 2-5 l/min ±250 ml/min From 5 l/min ±5%
O_2 Concentration	21% - 100% ±3%
Gas Connection O_2	DISS

INTERFACES:

- CARL Reperfusion Set
- CARL Cart
- Oxygen cylinder with pressure reducer (ZGA coupling according to DIN 13260)

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A HEARTBEAT AHEAD

PS_MOX_EN_2022_09_30_Rev01